DOCUMENT RESUME

ED 220 325 SE 039 087

AUTHOR	Agro, Sally; And Others
TITLE	Biology. USMES Beginning "How To" Set.
INSTITUTION	Education Development Center, Inc., Newton, Mass.; Unified Science and Mathematics for Elementary Schools, Newton, Mass.
SPONS AGENCY	National Science Foundation, Washington, D.C.
REPORT NO	ISBN-0-89292-029-7
PUB DATE	77
GRANT	SED-69-01071
NOTE	21p.; For related documents see SE 039 060-098, ED 142 362, and ED 183 367.
AVAILABLE FROM	ERIC Clearinghouse for Science, Mathematics, and Environmental Education, 1200 Chambers Rd., 3rd Floor, Columbus, OH 43212 ($1.50).
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Animal Facilities; *Animals; *Biology; Elementary School Mathematics; *Elementary School Science; Instructional Materials; Interdisciplinary Approach; Language Arts; Mathematics Education; Primary Education; *Problem Solving; Process Education; *Science Activities; Science Course Improvement Projects; Science Education; Social Studies; *Unified Studies Curriculum
IDENTIFIERS	National Science Foundation; *Unified Science Mathematics for Elementary Schools

ABSTRACT

In this set of two booklets for primary grades, students learn how to make a home for their animals (amphibians, insects, fish, crayfish) and a home for their rodents (hamsters, guinea pigs, gerbils, mice). The major emphasis in all Unified Sciences and Mathematics for Elementary Schools (USMES) units is on open-ended, long-range investigations of real problems. In most instances students learn through observing results of their own and their classmates' experiments. However, students may recognize the need for certain facts and/or skills during their investigations. Although some children prefer to work things out for themselves, others may ask for help. USMES "How To Sets" are designed to provide such assistance. Each booklet in a set contains several examples of children using a skill being taught, each example emphasizing a different aspect of the skill or a potential pitfall. Cover pages summarize what is being taught by illustrating the general problem and solution. There is no sequence to the sets (or booklets within sets) and they should not be used out of the context of childrens' open investigation of a practical problem. (Author/JN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED220325

HOW TO SET BIOLOGY

USMES BEGINNING
UNIFIED SCIENCE AND MATHEMATICS FOR ELEMENTARY SCHOOLS

IN THIS SET STUDENTS WILL FIND OUT HOW TO...

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

✓ This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

MAKE A HOME FOR YOUR ANIMAL

MAKE A HOME FOR YOUR RODENT

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY
Mary Ashford
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SE 039 087

WHAT IS USMES?

USMES challenges students to solve real problems within their school and community. Children tackle problems like a busy or unsafe intersection near their school, classroom furniture that doesn't fit them, or playgrounds that are crowded or uninteresting. These problems have immediate and practical impact on students. They have no established, correct solutions--students take or recommend action based upon whatever data they collect and analyze. Furthermore, the children themselves, not the teacher, direct the problem-solving process.

Solving real problems is interdisciplinary: skills, processes, and concepts from science, mathematics, social science, and language arts all play a part. For example, students conduct opinion surveys, build measuring devices, write letters, and make and use graphs. They also make decisions, work productively in small groups, and develop and clarify values.

The USMES curriculum is organized into twenty-six problems, or units, that have been developed in the classroom by teachers and students in a wide variety of schools. Most units can be used in grades K-8 although the level at which students approach a problem and develop a solution will vary according to age, ability, and interest.

RESOURCES FOR AN USMES PROGRAM

In addition to the USMES "How To" Series, there are--

The USMES Guide: This book describes the USMES project, real problem solving, classroom strategies, the Design Lab, the units, and the support materials as well as ways that USMES helps students learn basic skills.

Teacher Resource Books (one per unit): Each of these guides to using USMES units describes a broad problem, explains how students might narrow that problem to meet their particular needs, recommends classroom strategies, and presents logs from teachers whose classes have worked on the unit.

Design Lab Manual: This guide helps teachers and administrators set up, run, and use a Design Lab--a place with tools and materials where students can build things they need for their work on USMES units. A Design Lab may be a corner of a classroom, a portable cart, or a separate room.

Background Papers: These papers, correlated with the "How To" Series, provide teachers with information and hints that do not appear in the student materials.

Curriculum Correlation Guide: By correlating the twenty-six USMES units with other curriculum materials, this book helps teachers integrate USMES with other school activities and lessons.

The "How To" Series is a resource developed by the USMES project. Earle L. Lomon, Project Director, Betty M. Beck, Associate Director for Development, Thomas L. Brown, Associate Director for Utilization Studies, Quinton E. Baker, Associate Director for Administration.

This material is based upon research supported by the National Science Foundation under Grant No. SED69-01071. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the National Science Foundation.

©1977 by Education Development Center, Inc. All rights reserved.

Complete USMES Library ISBN: 0-89292-033-5
Beginning "How To" Series ISBN: 0-89292-029-7

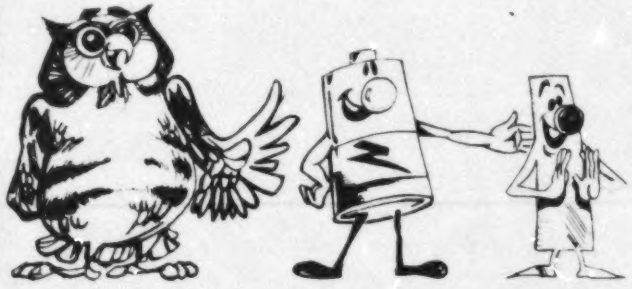
THE USMES BEGINNING "HOW TO" SERIES

USMES and Skills

USMES students often see a need to learn new skills to help them get a problem-solving job done. Children seeking to improve a street crossing may want to learn how to use a stopwatch or how to make a trundle wheel. Children comparing different brands of paper towels may want to learn how to design an experiment and how to make a bar graph. The list can go on and on, but the pattern is clear; solving a real problem requires skills.

Purpose of 'How To' Series

Written resources that help children learn skills like designing an opinion survey and choosing the appropriate measuring tool are not readily available for elementary school students. However, the USMES "How To" Series fills this gap. Its cartoon-style format helps younger children and those with reading difficulties acquire the skills and knowledge they need to do things like redesign their classroom, find the best buy in potato chips, or run a school store.



How to Use the 'How To' Series

Wait for a need. When a student asks for help, refer him or her to the appropriate booklet. Having a child read a booklet before there is a need to do so will not only result in less effective learning but will defeat the USMES purpose of allowing children to decide what needs to be done.

When necessary, use the "How To" Series as a teaching aid. Most of the time children will be able to go through a booklet by themselves and learn the skills they need to learn. However, some material in some sets is difficult and somewhat abstract. Such sections are usually towards the ends of booklets and often labeled "extra." When the booklet by itself is not doing the job, feel free to step in and help the student go through it.

Knowing how the content of the booklets are organized may help in using the series effectively.

- Each cover page summarizes what is in the booklet by illustrating the general problem and solution.
- Each booklet contains several examples of children using the skill being taught. Each example emphasizes a different aspect of the skill or a potential pitfall.
- Where a skill covered in one booklet is used in another, there is a reference in the form: See "How To...."

OTHER USMES 'HOW TO' SERIES

Intermediate "How To" Series: This magazine-style series covers in more detail essentially the same material as the cartoon-style series with a few booklets on additional skills. This series gives students a chance to read something they have a need to read.

Design Lab "How To" Series: These illustrated cards help children learn how to use tools safely and effectively.

"How To" Cards: These cards are printed on colored card stock rather than paper as the other series are. They contain fewer words than the *Intermediate "How To" Series* and utilize the American system of units (ft.-lb.-sec.) rather than the metric system.

BEGINNING "HOW TO" SERIES

BIOLOGY

How To
- Make a Home for Your Animal
- Make a Home for Your Rodent

COLLECTING DATA

How To
- Record Data
- Do an Experiment
- Make an Opinion Survey
- Choose a Sample

ELECTRICITY

How To
- Make Simple Circuits
- Make a Circuit Stay Together
- Add Things to a Circuit
- Make and Use Switches
- Fix a Circuit

GRAPHING

How To
- Choose Which Graph to Make
- Make a Bar Graph
- Make a Bar Graph Histogram
- Make a Conversion Graph
- Make a Line Chart
- Make a Line Graph
- Make a Scatter Graph
- Make a Slope Diagram

MEASURING

How To
- Use a Stopwatch
- Choose the Right Tool to Measure Distance
- Use a Trundle Wheel
- Make a Scale Drawing
- Find the Speed of Things

SIMPLIFYING DATA

How To
- Round Off Data
- Find the Median
- Find the Average

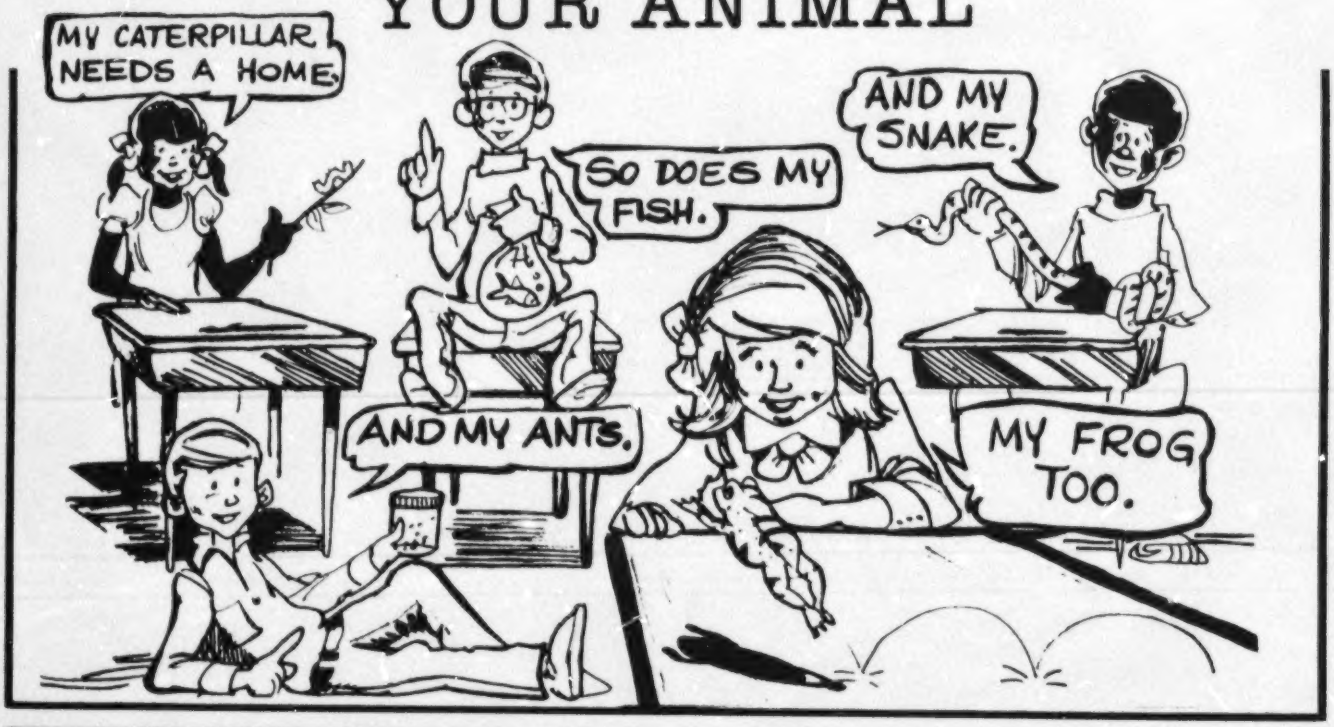
Conceived and Written by:
Sally Agro, Betty M. Beck, L. Ray Brady Jr., Jean Keskulla, Edward Manfre

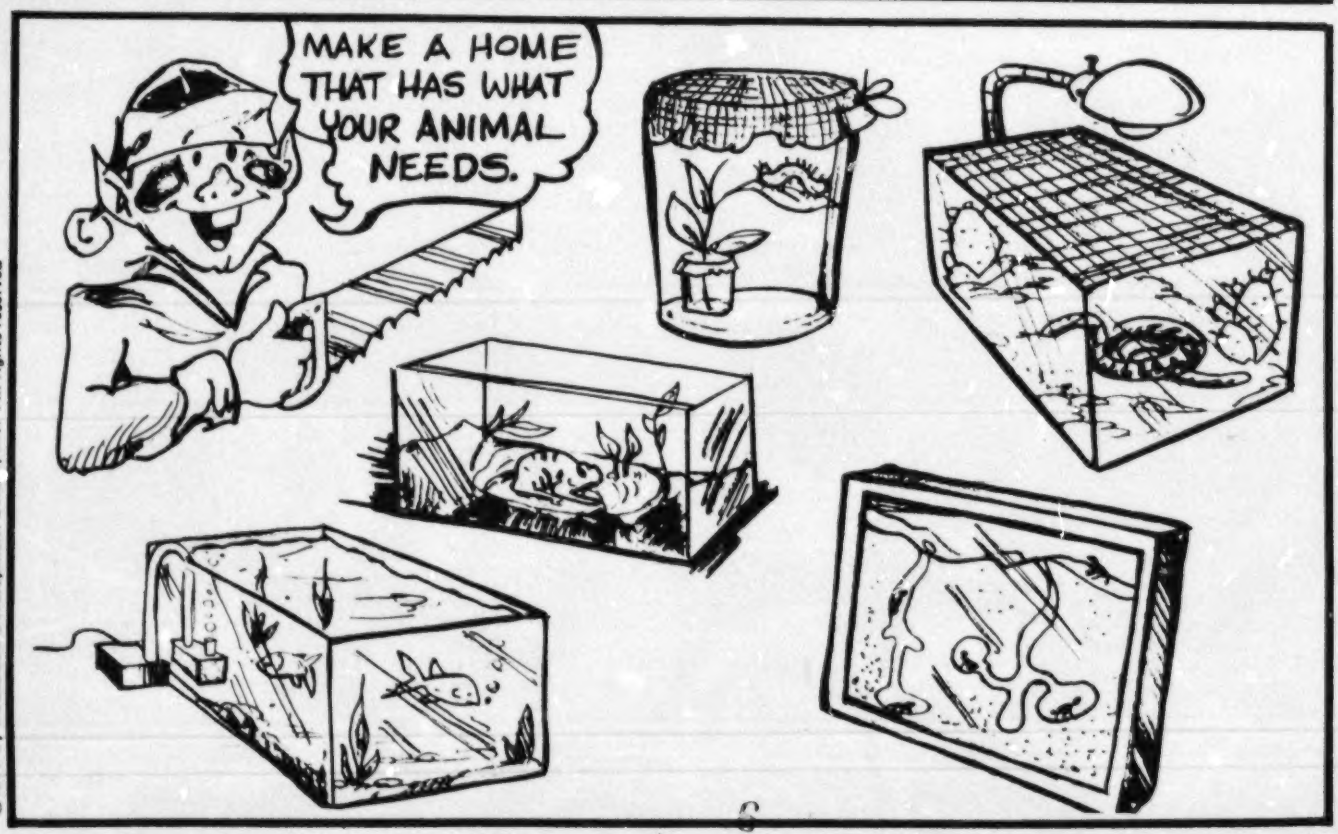
Illustrator: John M. Evans
Art Director: John W. Saalfield

Production Assistance
Paula Lakeberg

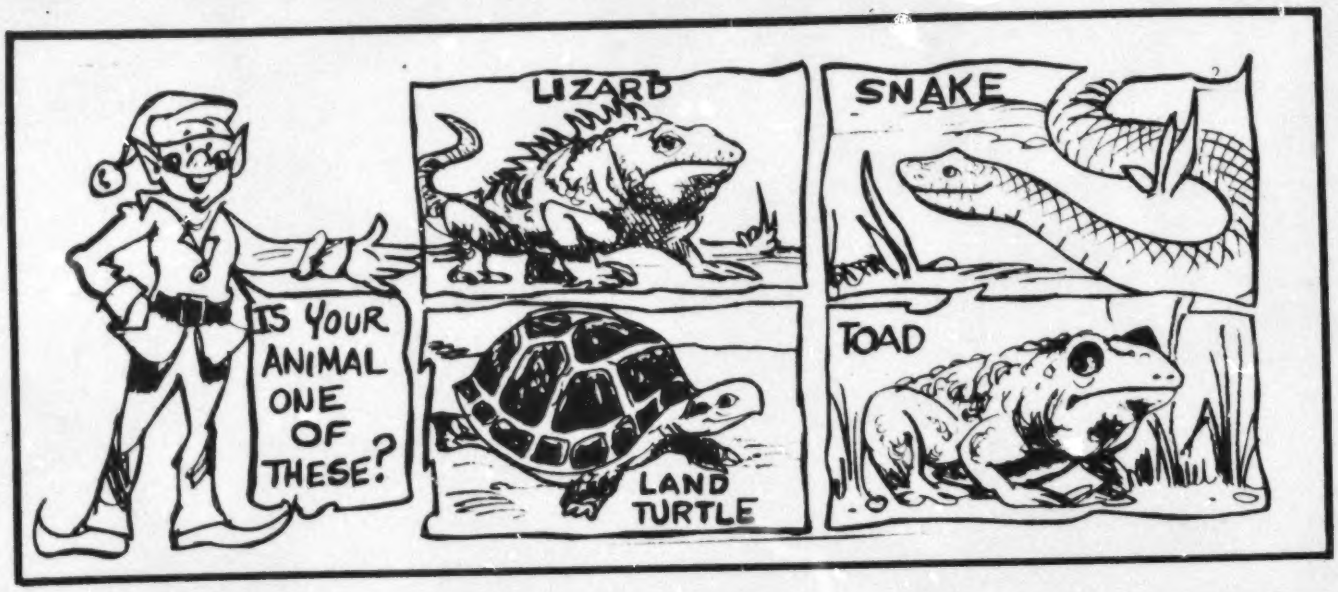
edc

HOW TO MAKE A HOME FOR YOUR ANIMAL





©1977 by Education Development Center, Inc. All rights reserved

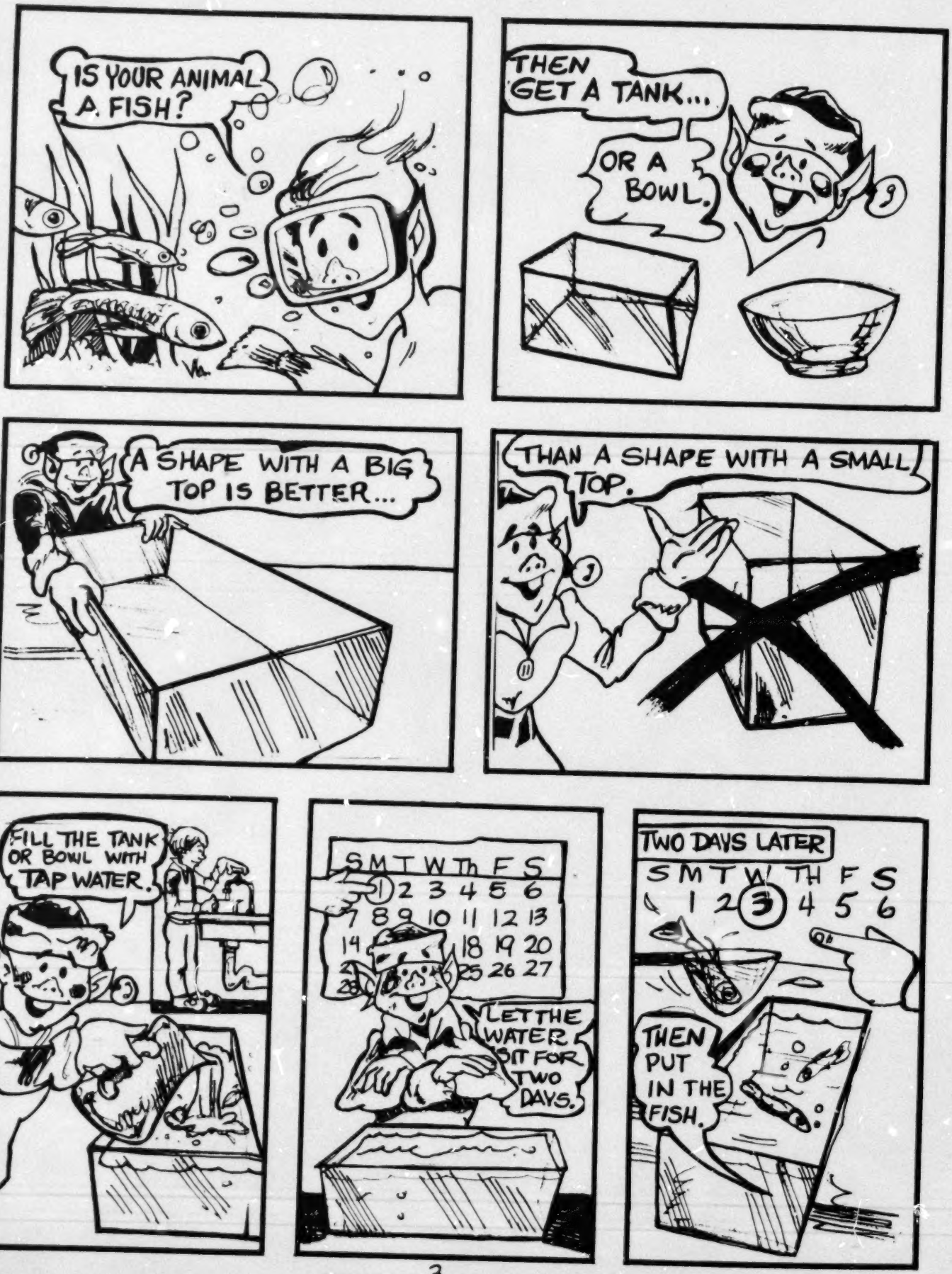

IS YOUR ANIMAL ONE OF THESE?
LIZARD
SNAKE
LAND TURTLE
TOAD

THEN YOUR HOME SHOULD HAVE A DISH FOR WATER...

AND SOME ROCKS AND PLANTS.

PUT A COVER ON THE HOME.

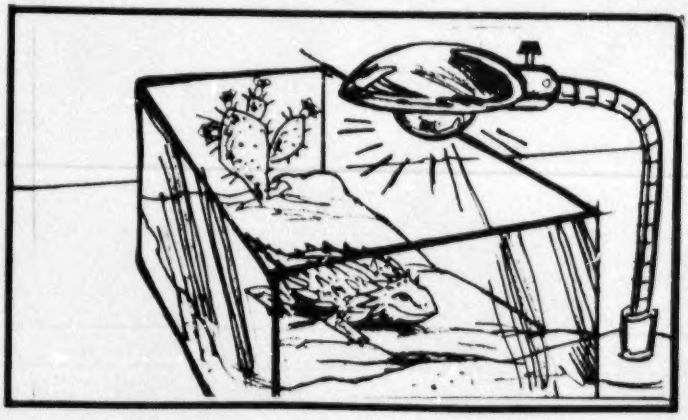
MAKE SURE YOUR COVER LETS AIR THROUGH.
AIR

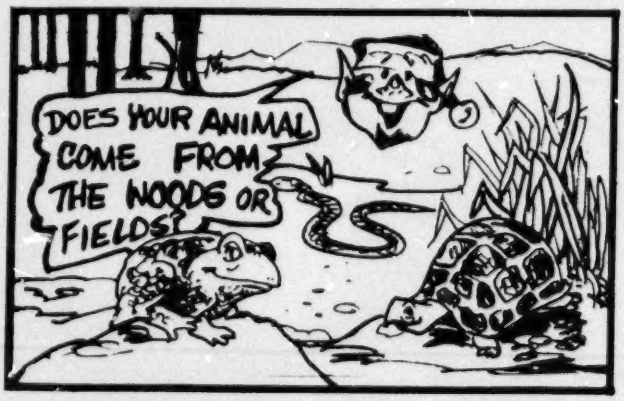

IS YOUR ANIMAL A FISH?
THEN GET A TANK...
OR A BOWL.
A SHAPE WITH A BIG TOP IS BETTER...
THAN A SHAPE WITH A SMALL TOP.
FILL THE TANK OR BOWL WITH TAP WATER.
S M T W Th F S
1 2 3 4 5 6
7 8 9 10 11 12 13
14 18 19 20
25 26 27
28
LET THE WATER SIT FOR TWO DAYS.
TWO DAYS LATER
S M T W TH F S
1 2 3 4 5 6
THEN PUT IN THE FISH.

DOES YOUR ANIMAL COME FROM THE DESERT?

THEN PUT SAND IN THE HOME...
SAND

AND SET UP A LAMP FOR LIGHT AND HEAT.

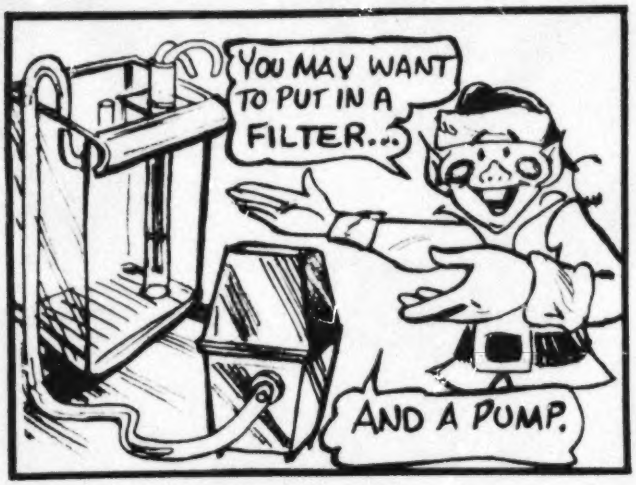



DOES YOUR ANIMAL COME FROM THE WOODS OR FIELDS?

THEN PUT SOME SOIL IN THE HOME.
SOIL

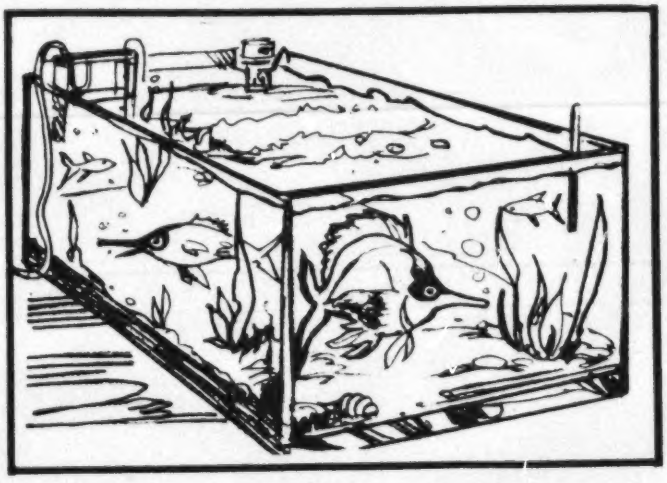
USE A HEATING PAD TO KEEP HIM WARM.
HOT PAD

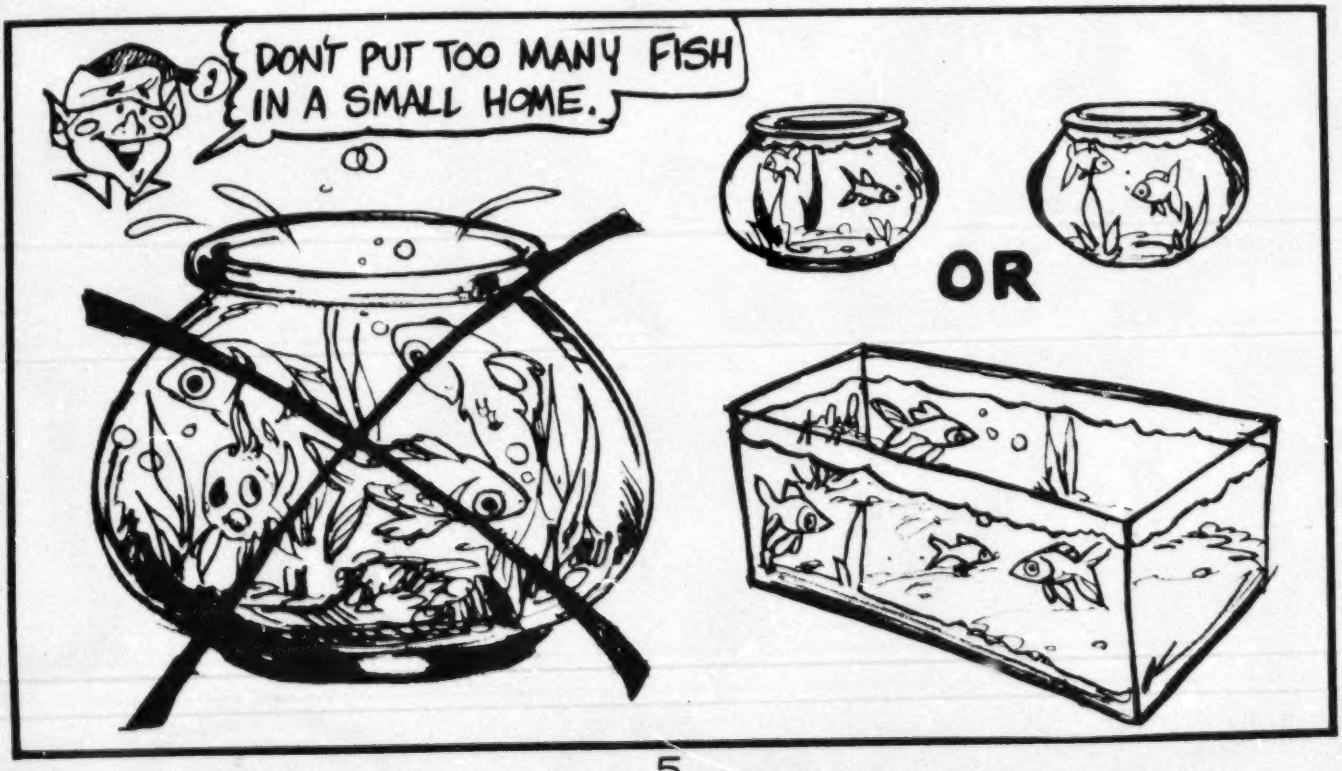
BE CAREFUL TO KEEP TEMPERATURE BETWEEN 20°-25° C.

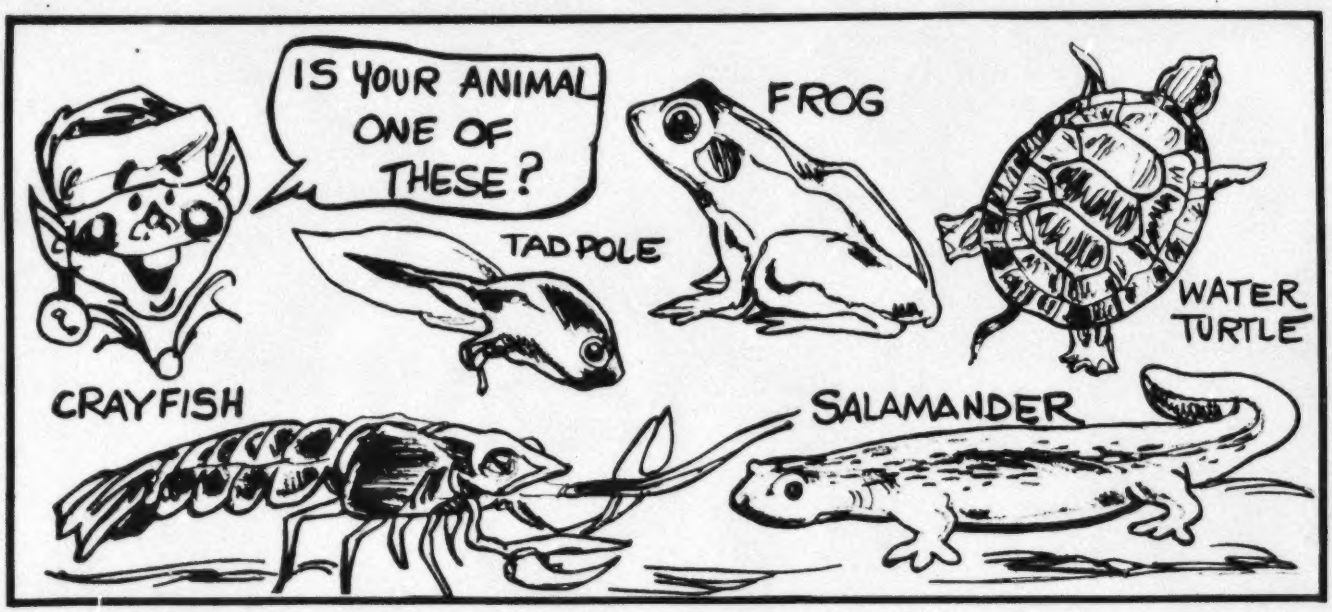

YOU MAY WANT TO PUT IN A FILTER...
AND A PUMP.

FOR SOME FISH YOU'LL NEED A HEATER...
AND A THERMOMETER TO SET THE DIAL ON THE HEATER.

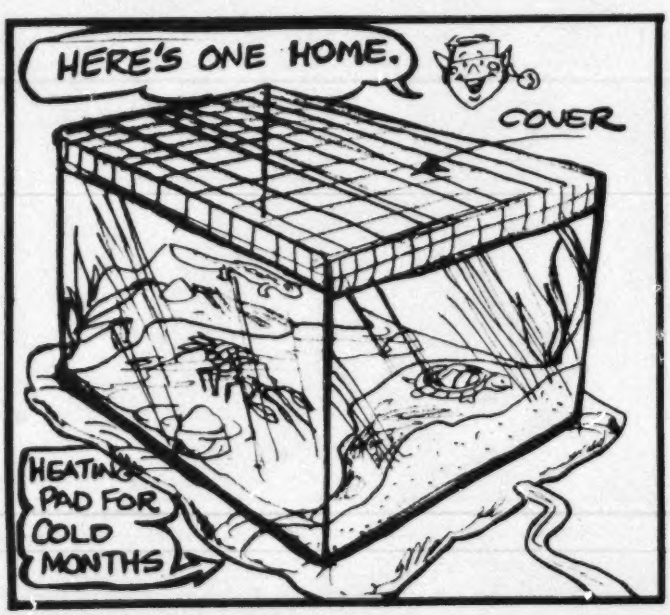
YOU CAN GET EXTRA THINGS.
GRAVEL




DON'T PUT TOO MANY FISH IN A SMALL HOME.
OR


IS YOUR ANIMAL ONE OF THESE?
FROG
TAD POLE
WATER TURTLE
CRAYFISH
SALAMANDER

THEN YOU'LL NEED SOIL, SAND, OR ROCK...
AND POND WATER.


HERE'S ONE HOME.
COVER
HEATING PAD FOR COLD MONTHS

HERE'S ANOTHER.

GRASSHOPPER
SPIDER
CATERPILLAR
BEETLE
IS YOUR ANIMAL AN INSECT OR SPIDER?
THEN GET A JAR...
OR A BOX
GET CHEESE CLOTH.
OR SCREENING
GET A PLANT...
OR A TWIG.
HERE'S ONE HOME.
HERE'S ANOTHER.

edc

This material is based upon research supported by the National Science Foundation under Grant No. SED69-01071. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the National Science Foundation.

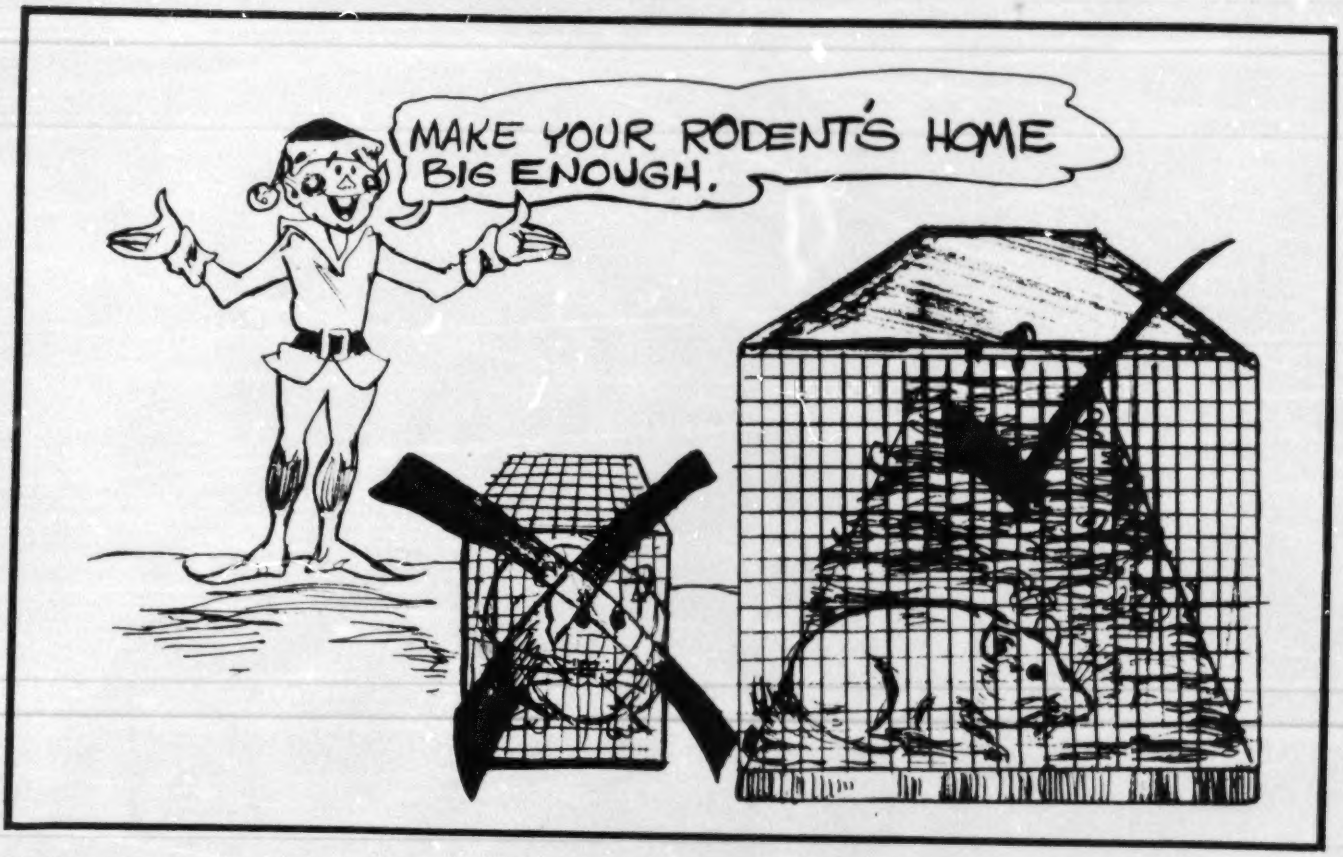
ISBN: 0-89292-029-7

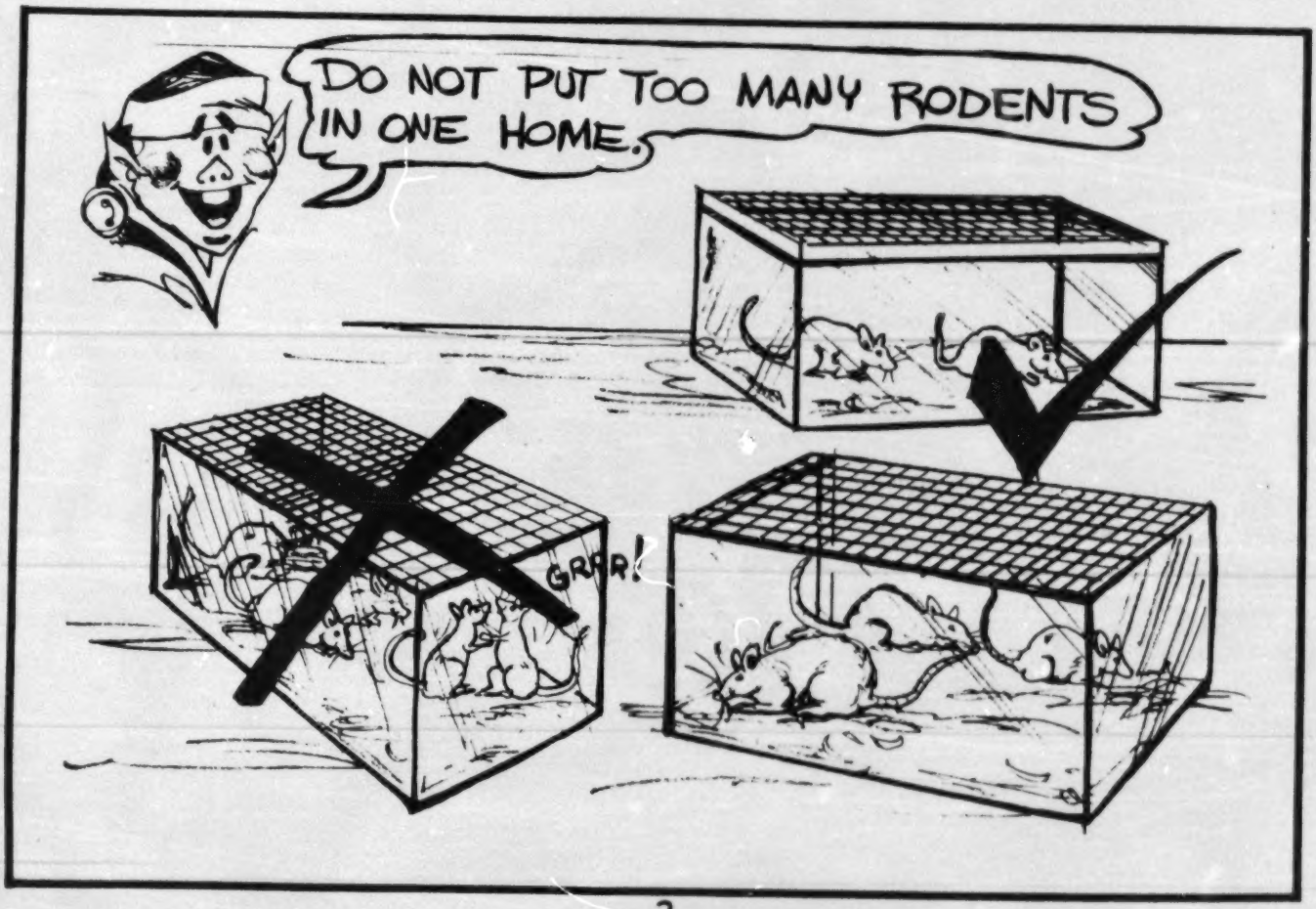
HOW TO

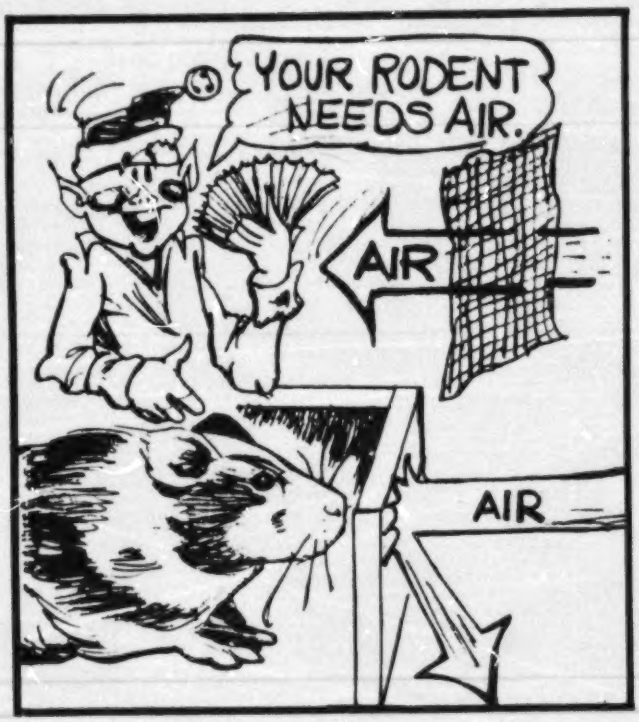
MAKE A HOME FOR YOUR RODENT

© 1977 by Education Development Center, Inc. All rights reserved

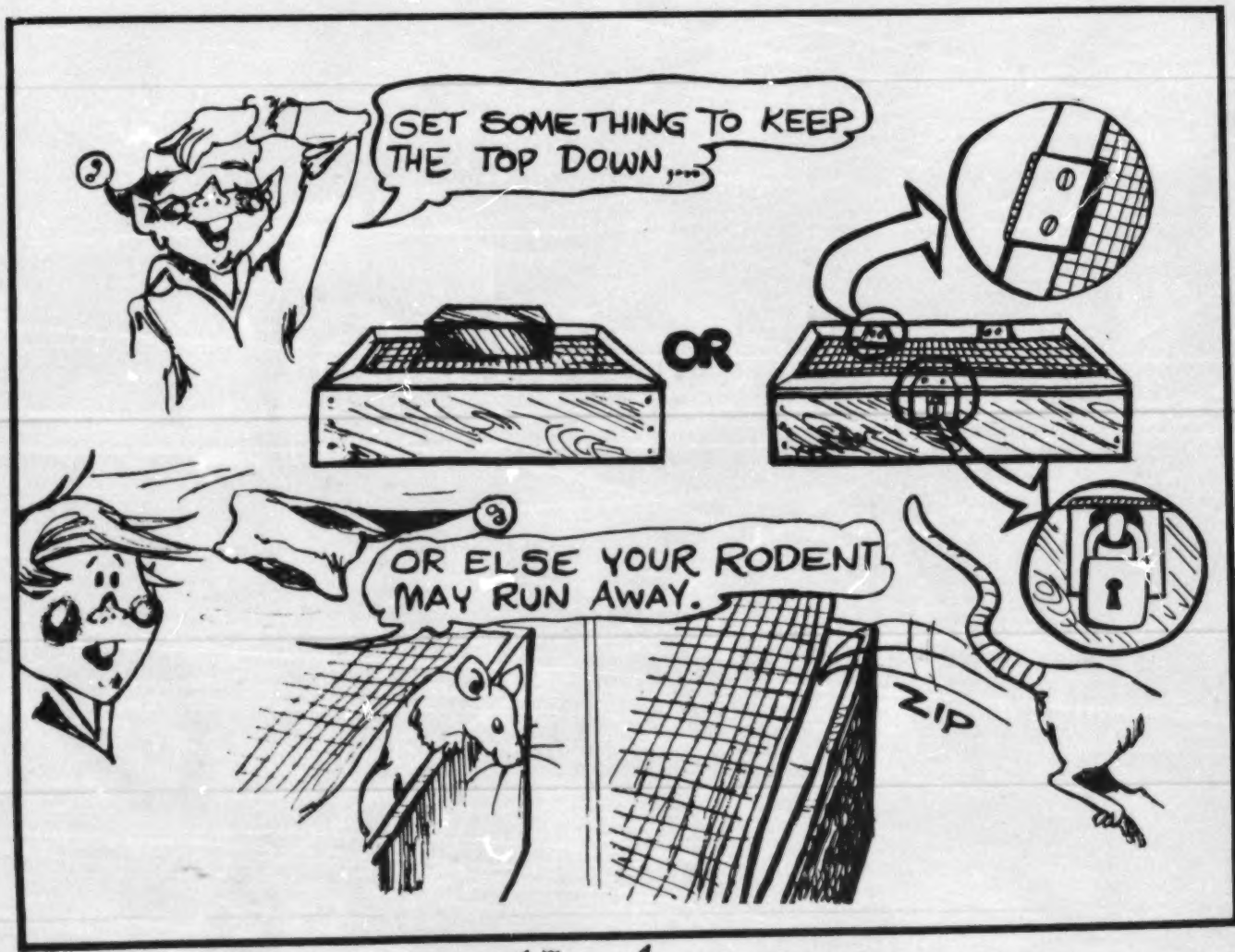
I'LL MAKE A HOME OUT OF CARDBOARD.
HOME
DON'T USE SOMETHING THAT YOUR ANIMAL WILL CHEW.
CARDBOARD
PAPER
THIN WOOD
MUNCH!
USE ANY OF THESE MATERIALS.
HEAVY SCREENING
THICK WOOD
TAPE
PLASTIC
GLASS
METAL


MAKE YOUR RODENT'S HOME BIG ENOUGH.


DO NOT PUT TOO MANY RODENTS IN ONE HOME.
GRRR!

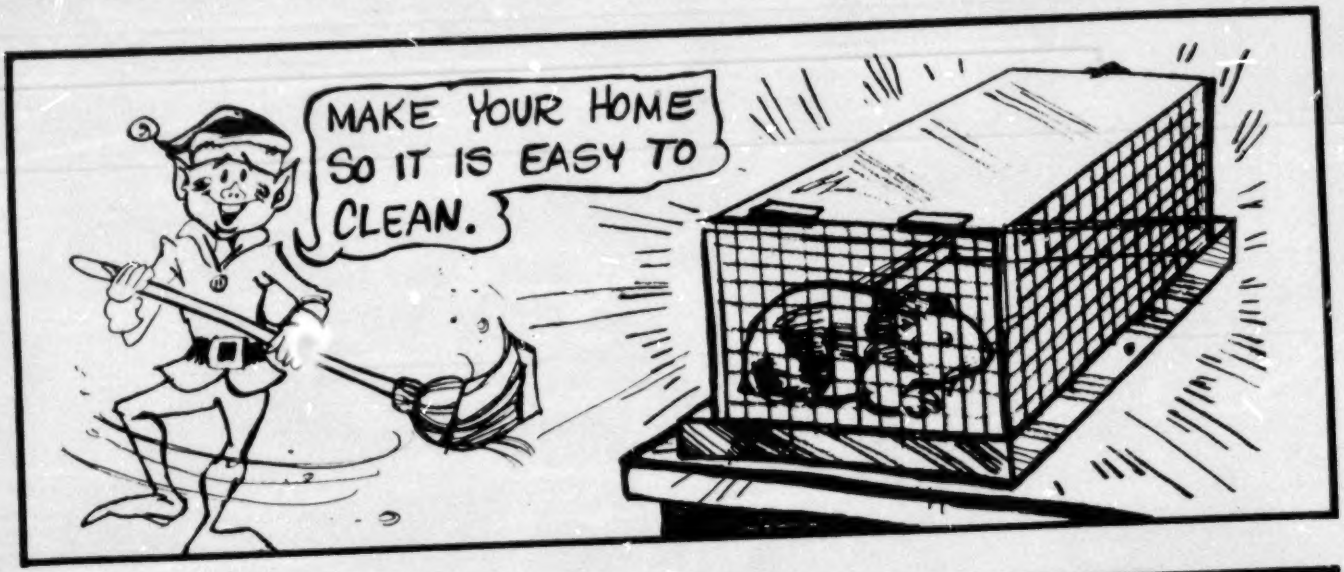

YOUR RODENT NEEDS AIR.
AIR
AIR

AT LEAST ONE SIDE OF THE HOME SHOULD HAVE OPENINGS.
AIR
AIR
AIR


GET SOMETHING TO KEEP THE TOP DOWN,...
OR
OR ELSE YOUR RODENT MAY RUN AWAY.
ZIP

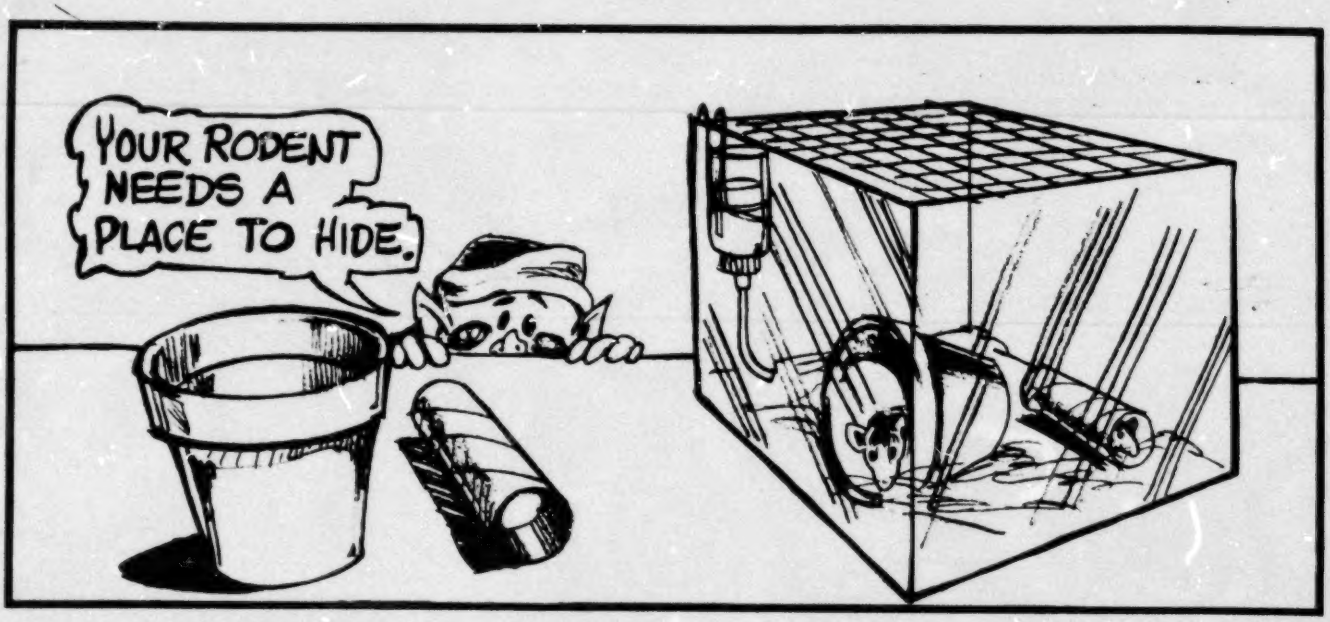
YOUR RODENT NEEDS WATER.
USE A WATER FEEDER THAT WON'T SPILL.
YOU CAN BUY ONE...
OR YOU CAN MAKE YOUR OWN.
HOT GLUE
GLASS OR PLASTIC TUBING

YOUR RODENT NEEDS BEDDING.
GET WOOD SHAVINGS FROM THE DESIGN LAB.
OR LET YOUR RODENTS MAKE THEIR OWN BEDDING.
CHOMP!
MUNCH
ZZZZZZ


MAKE YOUR HOME SO IT IS EASY TO CLEAN.

YOU CAN HAVE A TRAY ON THE BOTTOM.

OR YOU CAN HAVE A TOP THAT COMES OFF.



edc

This material is based upon research supported by the National Science Foundation under Grant No. SED69-01071. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the National Science Foundation.

ISBN: 0-89292-029-7